

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of :
Tuqiang NI *et al.* : Confirmation No. 5171
U.S. Patent Application No. 09/821,753 : Group Art Unit: 1763
Filed: March 30, 2001 : Examiner: Luz L. Alejandro Mulero
For: PLASMA PROCESSING METHOD AND APPARATUS WITH CONTROL OF
PLASMA EXCITATION POWER

APPELLANTS' SUPPLEMENTAL REPLY BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The Patent and Trademark Office sent attorney for appellants a paper entitled "Examiner's Answer" on May 5, 2009. The transmittal sheet accompanying this paper states there is an attachment in the form of a supplemental examiner's answer in response to the appeal brief filed January 22, 2008, and July 9, 2008, and the reply brief filed January 13, 2009. Based on the foregoing, the May 5, 2009 paper should have been designated a supplemental examiner's answer and appellants will treat it as such.

Pages 1-10 and page 11 to the paragraph beginning at the bottom of page 11 of the supplemental examiner's answer are verbatim copies of the November 13, 2008, examiner's answer. Page 13, line 3 through the end of the supplemental examiner's answer are verbatim copies of the original answer beginning at the last three lines of page 15 through the end of the original answer. These sections of the supplemental answer even repeat, from the original answer, (1) errors of syntax, (2) incorrectly located commas and (3) the statement "inventor Andrew D. Bailey, Ph D.", which inaccurately implies Doctor Bailey is an inventor of this application. Consequentially, appellants will only reply, in this supplemental reply brief, to the issues raised in the paragraph beginning at the bottom of page 11 and continuing through the three full paragraphs on page 12 of the supplemental answer. The paragraph bridging pages 12

and 13 of the supplemental answer includes "housekeeping" matters that do not require a response by appellants.

The paragraph bridging pages 11 and 12 of the supplemental examiner's answer correctly notes that Chao discloses a processor based system controller. However, this paragraph ignores the argument set forth in the first full sentence on page 2 of the appellants' reply brief which indicates claim 59 requires a stored signal to control the amount of AC power applied to an AC etchant plasma, wherein the controlled amount of applied AC power causes gradual preprogrammed changes in the amount of AC power supplied to the etchant plasma during etching and the stored signal causes the gradual power change to be such as to cause a gradual transition in the shape of the material in the workpiece being etched.

The first full paragraph on page 12 of the supplemental examiner's answer is very confusing. The first sentence of this paragraph states "Appellant additionally argues that the limitations of the claims were not contemplated by Chao et al. as demonstrated by several steps included in Chao et al. and are not included in the claimed invention." Apparently, this comment was made in response to the second and third sentences in the first full paragraph on page 2 of the reply brief. A full reading of these two sentences of the reply brief indicates appellants have argued that the limitations concerning gradual transitions in the amount of AC power supplied to the etchant plasma enable several steps of the Chao et al. process to be avoided. If Chao et al. had employed gradual transitions in the amount of AC power supplied to the etchant plasma, the need for these additional steps would have been avoided. A similar argument is set forth in the only full paragraph of appellants' original brief. The need by Chao et al. for these additional steps is proof that Chao et al. did not possess the concept of providing gradual transitions in the amount of AC power supply to the etchant plasma.

The second and third sentences of the first full paragraph on page 12 of the supplemental examiner's answer seem to state that appellant is relying upon certain features, such as an isotropic etch used to etch a trench and which produces sharp corners at the top and bottom of the trench and the soft etch process. In fact,

appellants have argued in the last full paragraph on page 2 of the reply brief that Chao et al. includes these steps. The paragraph bridging pages 5 and 6 of the reply brief indicates that because Chao et al. includes these steps, Chao et al. does not include the requirement of claim 47 for gradually changing, on a pre-programmed basis, the amount of AC power supplied to plasma during etching of a workpiece. Chao et al. would not have needed to use an isotropic trench etch which produces sharp corners at the top and bottom of the trench and the soft etch process if they had realized rounded corners could have been attained by gradually changing the power applied to the plasma. A similar argument is in appellants' original brief in the only full paragraph on page 15.

The second full paragraph on page 12 of the supplemental examiner's answer includes a conclusionary statement that has no basis in fact. This paragraph seems to admit that Chao et al. does not disclose a gradual power increase or decrease during etching and that Chao et al. merely indicates source power can be increased or decreased. This does not mean source power is gradually increased or decreased during etching to provide a gradual transition in the shape of the material. There is no basis in Chao et al. for the conclusionary statement in the supplemental examiner's answer that increasing and decreasing source power "would have taught to one of ordinary skill in the art at the time the invention was made to gradually increase or decrease the source power during processing in order to increase or decreasing the rounding at the bottom corners of the trench and therefore form a more or less rounded profile as shown in Chao et al. (for example, see figs. 4D-4E)." Figure 4D is a schematic cross-section view of the trench of figure 4C after a bottom corner rounding process (BCR), while figure 4E is a schematic cross-sectional view of the trench of figure 4D after a soft etch has been performed.

The bottom corner rounding process is discussed in the two full paragraphs on page 3 and the first paragraph on page 4 of the reply brief, while the soft etch is discussed in the last paragraph on page 4 and the first paragraph on page 5 of the reply brief. It is there indicated that both of these processes are chemical processes, that is, chemical reactions are relied on to form the bottom corner and perform the soft etch.

The chemical reactions can be performed without applying electric power to the plasma or by applying a minimum amount of electric power to the plasma. Because electric power is not important in performing the bottom corner rounding and soft etch processes disclosed by Chao et al., the Chao et al. bottom corner rounding a soft etch processes would not lead one of ordinary skill in the art to gradually change the electric power supplied to the plasma to form a gradual transition in the etched material. Similar arguments are in appellants' original brief at the last two paragraphs on page 13 and the second paragraph on page 14.

The last full paragraph on page 12 of the supplemental examiner's answer repeats the arguments set forth on page 8 of the original examiner's answer and which are considered in appellants' original brief in the paragraph bridging pages 14 and 15 and on pages 21-23 and in the reply brief at the last full paragraph on page 7 and the paragraph bridging pages 7 and 8.

Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 07-1337 and please credit any excess fees to such deposit account.

Respectfully submitted,

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